- # Introduction and cell Injury

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Introduction

- **Pathology** is the study of disease.
- It describes the manifestations of:
- **The disease, its process and sequelae (the consequences of a previous disease or injury) and attempts to determine the cause (etiology) and underlying the mechanism (Pathogenesis).**
- It form a bridge between basic
- **SCIENCE AND CLINICAL PRACTICE.**

Definition of Pathology

It is the “scientific study of disease“.

"scientific study of the molecular, cellular, tissue, or organ system response to injurious agents."

Pathology serves as a **"bridge"** or **"link"** between the preclinical sciences (**anatomy, physiology, ...etc**.) and the courses in Clinical.

What is the Disease?

- It is the “state in which an individual exhibits an anatomical, physiological, or biochemical deviation from the normal”.

Disease may be defined as:

An abnormal alteration of structure or function in any part of the body.

Basic Language of Pathology

- In order for a subject or course to be meaningful,

- One should become familiar with the basic terminology applicable to that subject!!!!!!

Learning Pathology

- General Pathology
  - Common changes in all tissues. e.g.. Inflammation, cancer, ageing, edema, hemorrhage ….etc.
- Systemic Pathology
  - Discussing the pathologic mechanisms in relation to various organ systems e.g. CVS, CNS, GIT…..etc.

What should we know about a Disease?

- Definition.
- Epidemiology – Where & When.
- Etiology – What is the cause?
- Pathogenesis - Evolution of dis.
- Morphology - Structural Changes
- Functional consequences
- Management
- Prognosis
- Prevention

Pathology

Pathology focuses on 4 aspects of disease

- *ETIOLOGY:* Cause of disease.
- *PATHOGENESIS:* Mechanisms of development of disease.
- *MORPHOLOGY:* The structural alterations induced in cell and tissues.
- Functional results of the morphologic changes, as observed clinically.

Manifestations of Diseases

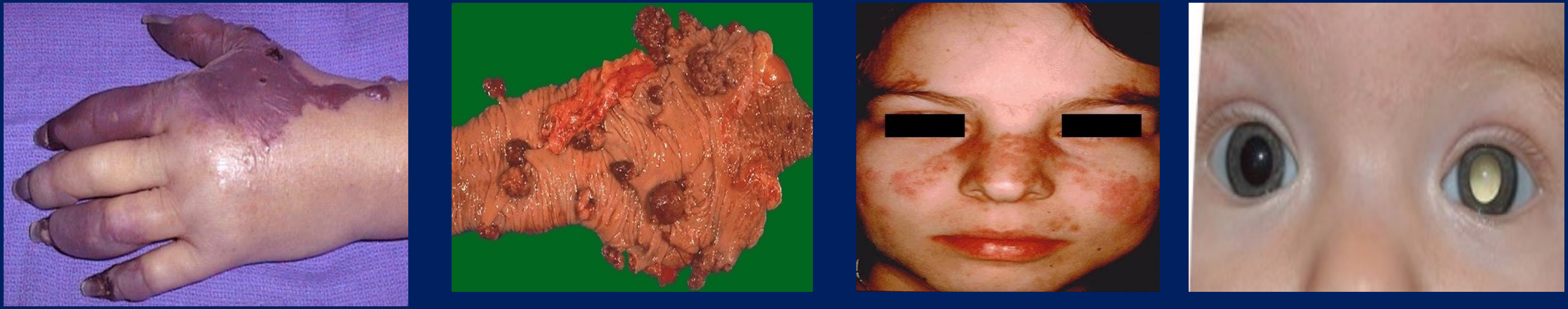
The manifestations of a disease are the sum of the damage done by a harmful agent and the body's response.

The variation in these components accounts for the great diversity of disease, which can be classified into 4 main groups:

1. Developmental – genetic, congenital.
2. Inflammatory - trauma, infection, immune
3. Neoplastic - tumors, cancers.
4. Degenerative – ageing
5. Iatrogenic – drug-induced

Manifestations of Diseases

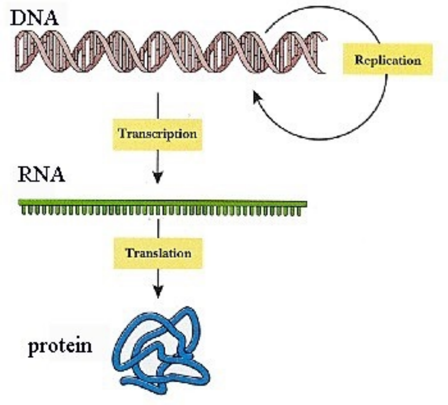
- Signs – are objective findings as perceived by an examiner, physician or dentist
- Symptoms – are functional manifestations or evidences of a disease process
- Lesions – are visible changes produced by a disease in the tissues or organs. They are usually local abnormalities which could be benign, cancerous, gross, occult, or primary.



- Exacerbations – a sudden increase in the severity or seriousness of the signs and symptoms during the course of a disease.
- Remissions – become less intense at a time.
- Complications – unfavorable conditions that arise during the course of a disease
- Sequelae – are remote aftereffects produced by a disease.

ETIOLOGY

Knowledge or discovery of the primary etiology remains the backbone on which a diagnosis can be made and a disease process can be best understood so that a treatment can be prescribed.

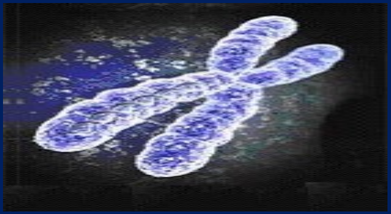


THE ETIOLOGICAL FACTORS ARE:

- ENVIRONMENTAL FACTORS
- GENETIC FACTORS
- IINDIRECT CAUSES

ENVIRONMENTAL FACTORS ARE:

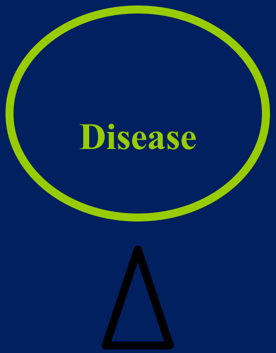
- PHYSICAL AGENTS – radiation, trauma or mechanical injury, thermal changes, electrical, nuclear or X-rays, changes in atmospheric pressure
- CHEMICAL AGENTS – chemicals, poisons like venoms or toxins, corrosive agents like strong acids and alkalis
- NUTRITIONAL DEFICIENCES AND EXCESSES
- INFECTIONS AND INFESTATIONS
- ABNORMAL IMMUNOLOGICAL REACTIONS
- PSYCHOLOGICAL FACTORS



GENETIC FACTORS: ABNORMAL GENES

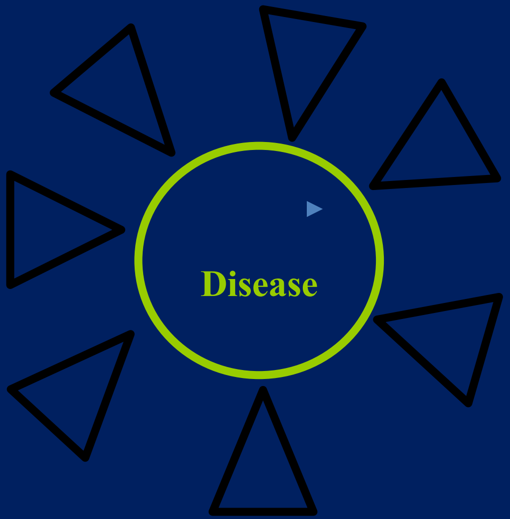
INDIRECT CAUSES: pertain to the predisposing factors like age, age, sex, environment, race, climate, state of nutrition, habits

Etiology



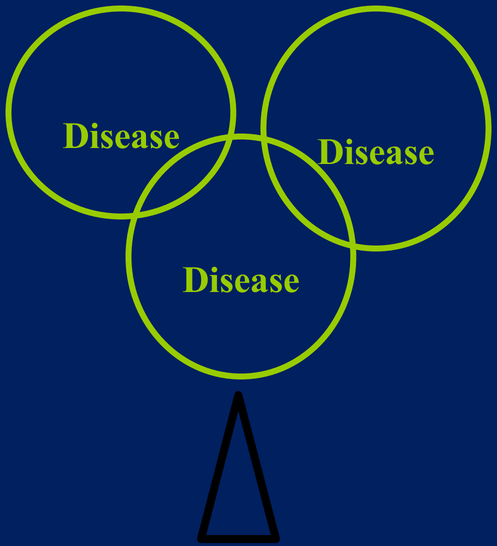
- One etiologic agent

one disease, as Malaria



- **Several etiologic agents**

one disease, as diabetes .


Disease
Disease
Disease

- **One etiologic**

agent several diseases, as

smoking.

Etiology:
What is the cause?

- ***Environmental agents:***
  - Physical
  - Chemical
  - Nutritional
  - Infections
  - Immunological
  - Psychological
- ***Genetic Factors:***
  - Age
  - Genes

Multifactorial

As Diabetes
Hypertension

Cancer

Pathogenesis

- The sequence events in the response of the cells or tissues to the etiologic agent, from the initial stimulus to the ultimate expression of the disease, "from the time it is initiated to its final conclusion in recovery or death”

  - *The core of the science of pathology — the study the pathogenesis of the disease.*

Methods of studying Pathology

- GROSS EXAMINATION
- LIGHT MICROSCOPY
- IMMUNOCHEMISTRY

- ELECTRON MICROSCOPY

- MOLECULAR BIOLOGY

- **Necropsy:** Gross examination of the animal cadaver by systematic dissection in order to evaluate any abnormal changes **(lesions)** that may be present.

- **Autopsy:** Synonymous to necropsy in human medicine.

- ***Biopsy:*** *Removal and examination of tissue*

Types of Diseases

- ***Acute*** – characterized by a sudden onset or in a rapid course.
- ***Fulminating*** – an acute fatal disease
- **Chronic** – slow onset and long duration or having a long course
- ***Intercurrent*** – occurs during the course of another disease
- ***Idiopathic*** – disease with unknown cause
- ***Teratogenic*** – diseases that are cause by drugs that cross the placental barrier and harm the fetus
- ***Contagious*** – transmitted by direct, intimate or by skin contact
- ***Venereal*** – transmitted by sexual contact
- ***Infectious*** – are caused by pathogenic microorganisms
- ***Communicable*** – are transmitted by agents, fomites, vector or carrier

Prognosis

Expected outcome of the disease; it is the clinician's estimate of the severity and possible results of a disease. (Continue)